OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **BAXTER LAKE** the program coordinators recommend the following actions.

FIGURE INTERPRETATION

- Figure 1: These graphs illustrate concentrations of chlorophyll-a, also a measure of algal abundance, in the water column. Algae are microscopic plants that are a natural part of lake ecosystems. Algae contain chlorophyll-a, a pigment necessary for photosynthesis. A measure of chlorophyll-a can indicate the abundance of algae in a lake. The historical data (the bottom graph) show a *stable* in-lake chlorophyll-a trend. On average, Baxter Lake chlorophyll-a concentrations are below the mean for New Hampshire lakes. There was a slight increase in chlorophyll-a concentrations this season with a peak in June. The June peak was due to the blue-green algae, *Anabaena*, which was the most abundant in the plankton haul. The presence of blue-green algae as the dominant species should raise some alarm, as this species is considered a nuisance. While algae are present in all lakes, an excess amount of any type is not welcomed. Concentrations can increase when there are external and internal sources of phosphorus, which is the nutrient algae depend upon for growth. It's important to continue the education process and keep residents aware of the sources of phosphorus and how it influences lake quality.

- Figure 2: Water clarity is measured by using a Secchi disk. Clarity, or transparency, can be influenced by such things as algae, sediments from erosion, and natural colors of the water. The graphs on this page show historical and current year data. The lower graph shows a *stable* trend in lake transparency. The decrease in transparency in June was due to the increased algal abundance at that time. The 2000 sampling season was considered to be wet and, therefore, average transparency readings are expected to be slightly lower than last year's readings. Higher amounts of rainfall usually cause more eroding of sediments into the lake and streams, thus decreasing clarity.

- Figure 3: These figures show the amounts of phosphorus in the epilimnion (the upper layer in the lake) and the hypolimnion (the lower layer); the inset graphs show current year data. Phosphorus is the limiting nutrient for plants and algae in New Hampshire waters. Too much phosphorus in a lake can lead to increases in plant growth over time. These graphs show a *stabilizing* trend for in-lake phosphorus levels. There was an increase in phosphorus concentrations in June, which likely caused the blue-green algae, *Anabaena*, to be abundant. Phosphorus concentrations have historically been near the New Hampshire median. A goal for the association should be to keep phosphorus levels below the median. One of the most important approaches to reducing phosphorus levels is educating the public. Humans introduce phosphorus to lakes by several means: fertilizing lawns, septic system failures, and detergents containing phosphates are just a few. Keeping the public aware of ways to reduce the input of phosphorus to lakes means less productivity in the lake. Contact the VLAP coordinator for tips on educating your lake residents or for ideas on testing your watershed for phosphorus inputs.

OTHER COMMENTS

- As in 1999, the dissolved oxygen measured in Baxter Lake was quite low this year (Table 9) and was at the borderline for fish stress and survival. We suggest the biologist's visit should be later in the summer next year. Typically, dissolved oxygen becomes depleted as the waters warm throughout the summer. Although the readings may have been a result of equipment failure, it would be a good idea to test Baxter Lake for dissolved oxygen in August.

- The blue-green algae *Anabaena* and *Microcystis* were observed in the plankton sample (Table 2). As we stated in the Figure Interpretation section above, the chlorophyll-a concentration in June was affected by the presence of these species. Blue-green algae can become nuisance species when sufficient nutrients and favorable environmental conditions are present. While overall algae abundance continues to be very low in the lake, the presence of these indicator species should serve as a reminder of the lake's delicate balance. Continued care to protect the watershed by limiting or eliminating fertilizer use on lawns, keeping the lake shoreline natural, and properly maintaining septic systems and roads will keep algae populations in balance.

- While conductivity levels in and around the lake were less this summer than in 1999 it is evident the levels continue to be higher than the data from the early 1990s (Table 6). Conductivity increases often indicate the influence of human activities on surface waters. Septic system leachate, agricultural runoff, iron deposits, and road runoff can all influence conductivity. This decreasing trend is a positive sign, but the increased rainfall experienced throughout New Hampshire likely affected levels this year. More rains seemingly helped to flush the lake and tributaries of pollutants. We will continue to observe the conductivity levels in Baxter Lake.

- To follow up on last year's report, Dineen Brook's phosphorus levels returned to their normal concentrations this summer (Table 8). While the concentrations are still in the average range, the decrease from last year was a welcome one. Apparently the drier conditions last year and the wetter ones this year influenced the brook. We hope the phosphorus in Dineen Brook will remain at these levels or possibly decline further.

- *E. coli* originates in the intestines of warm-blooded animals (including humans) and is an indicator of associated and potentially harmful pathogens. Bacteria concentrations were all very low at the sites tested (Table 12). If residents are concerned about septic system impacts, testing when the water table is high or after rains is best. Please consult the Other Monitoring Parameters section of the report for the current standards for *E. coli* in surface waters.

NOTES

- Monitor's Note (6/30/00): Lake drawn down again. Strong sewage odor on land by house with leach field. Drainage sampled which had a strong smell also; drainage had evident iron bacteria.

- Monitor's Note (8/25/00): More weeds this year, but a beautiful lake.

USEFUL RESOURCES

Bacteria in Surface Waters, *WD-BB-14*, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

A Brief History of Lakes, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

Lake Protection Tips: Some Do's and Don'ts for Maintaining Healthy Lakes, *WD-BB-9*, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

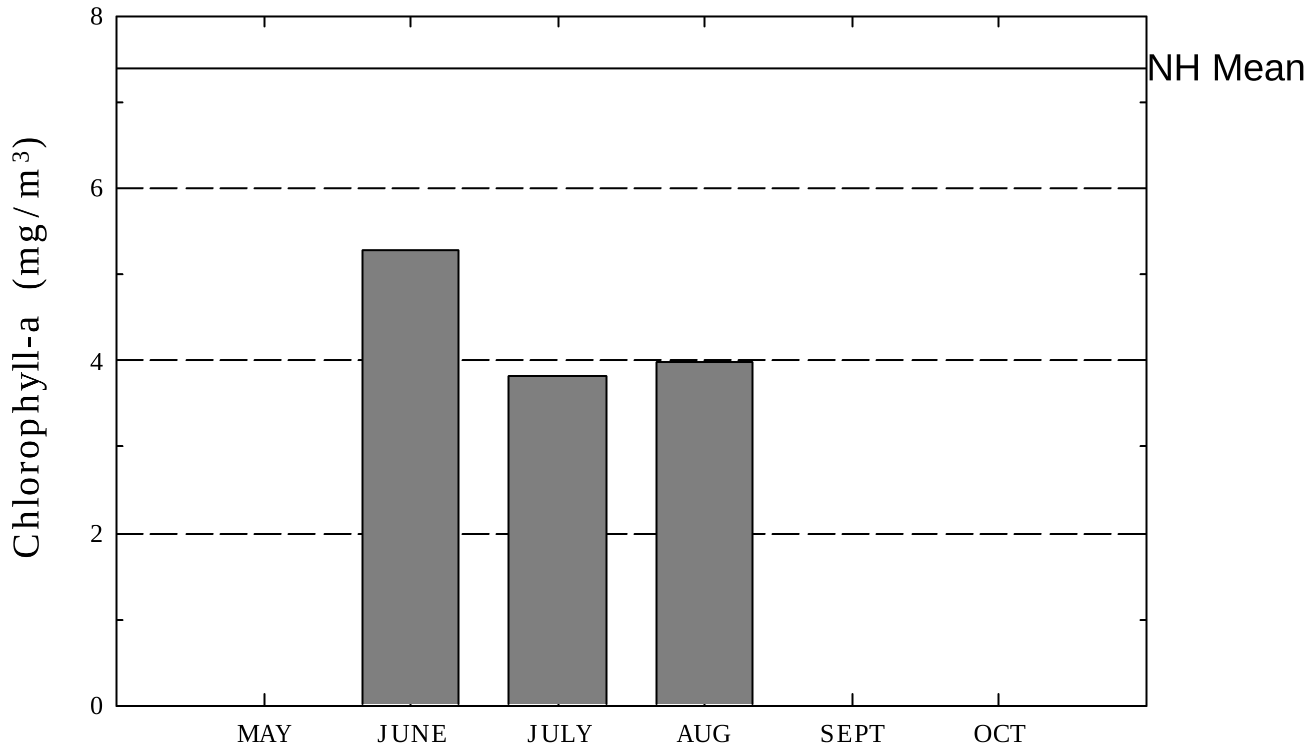
Phosphorus in Lakes, WD-BB-20, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Shoreland Plantings, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

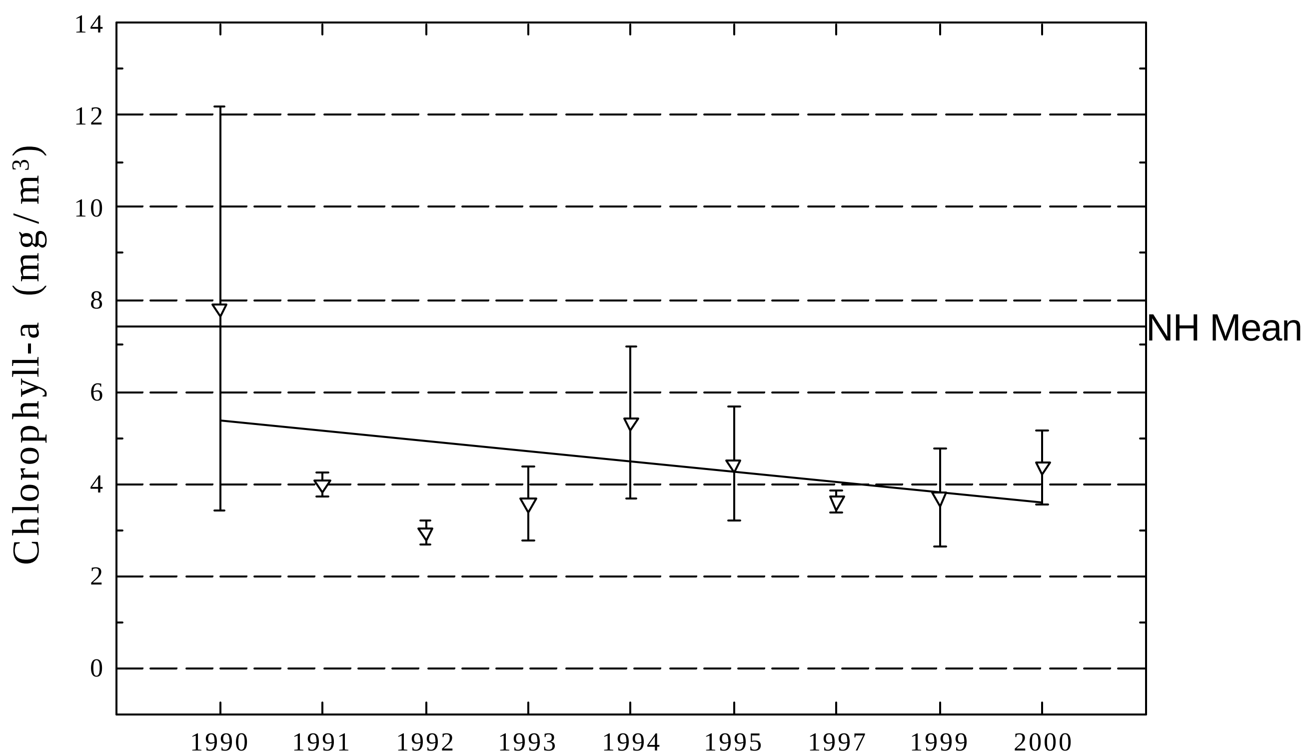
Lake Drawdown, *WD-BB-12*, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Baxter Lake

Figure 1. Monthly and Historical Chlorophyll-a Results



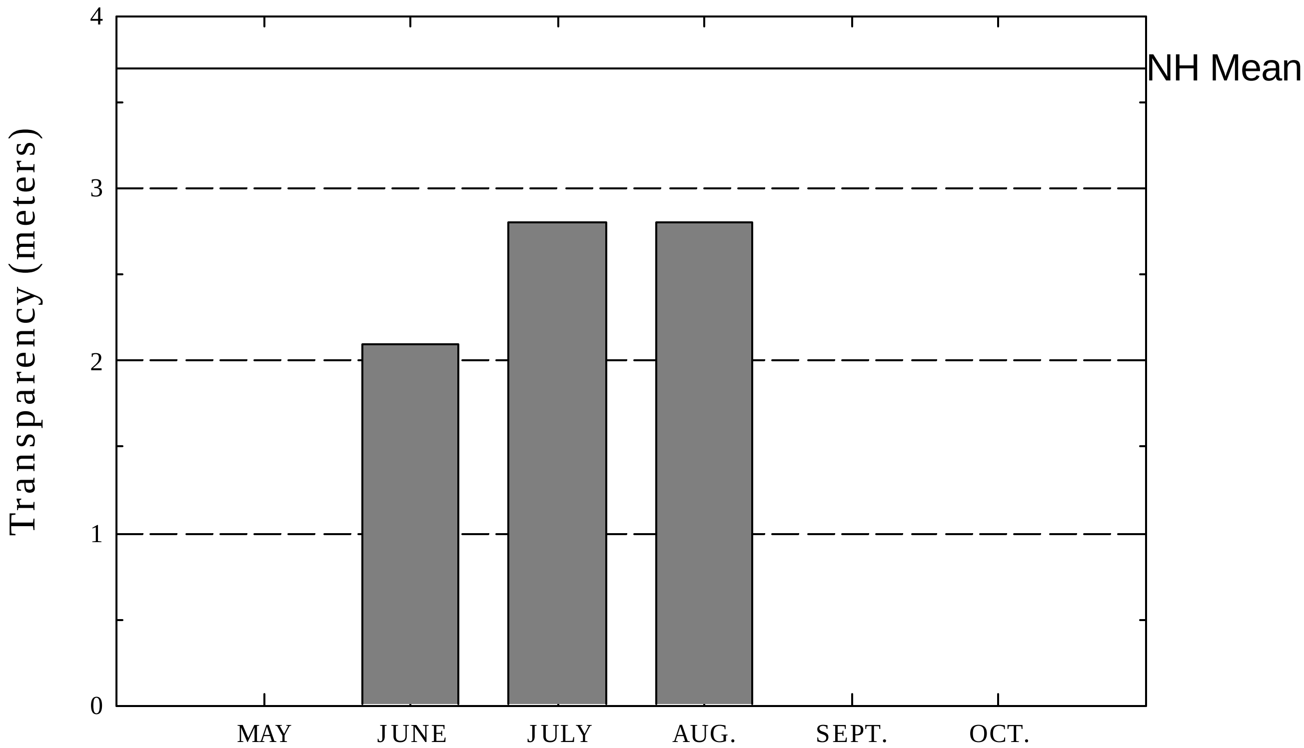
2000 Chlorophyll-a Results



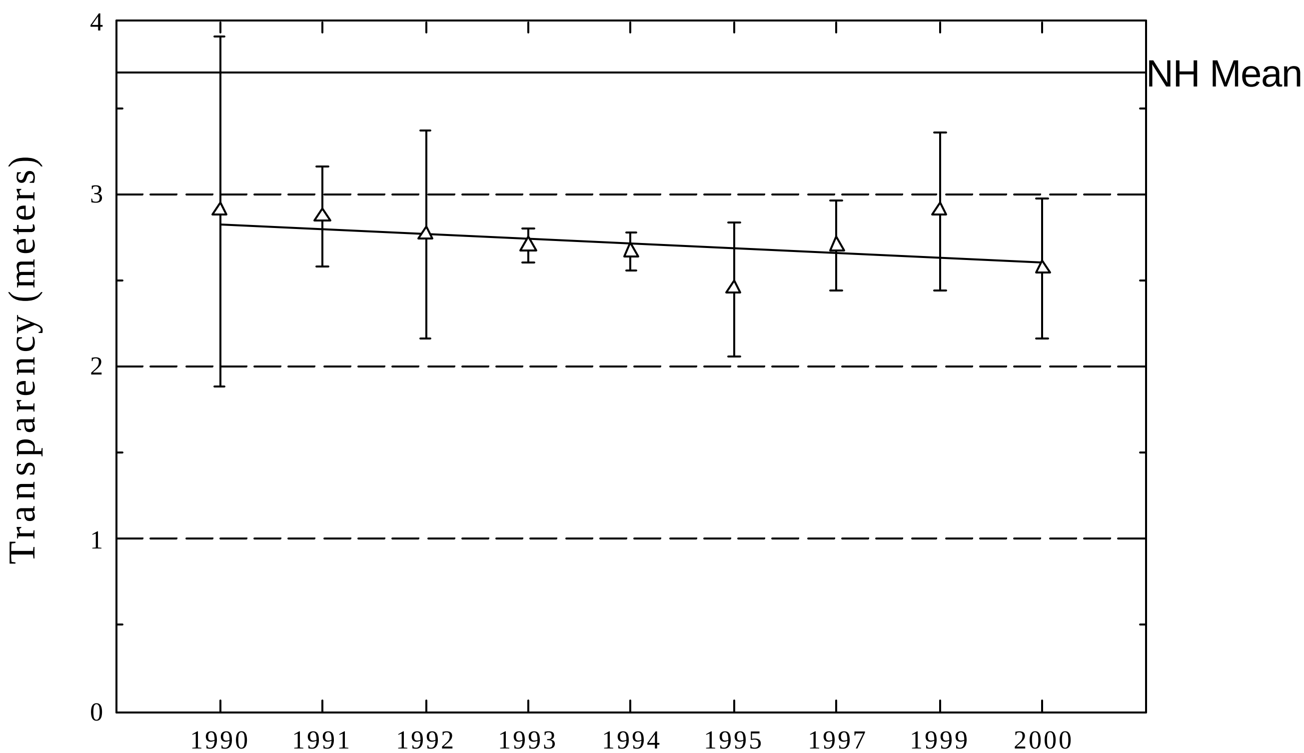
Historical Chlorophyll-a Results

Baxter Lake

Figure 2. Monthly and Historical Transparency Results



2000 Transparency Results



Historical Transparency Results

Baxter Lake

Figure 3. Monthly and Historical Total Phosphorus Data.

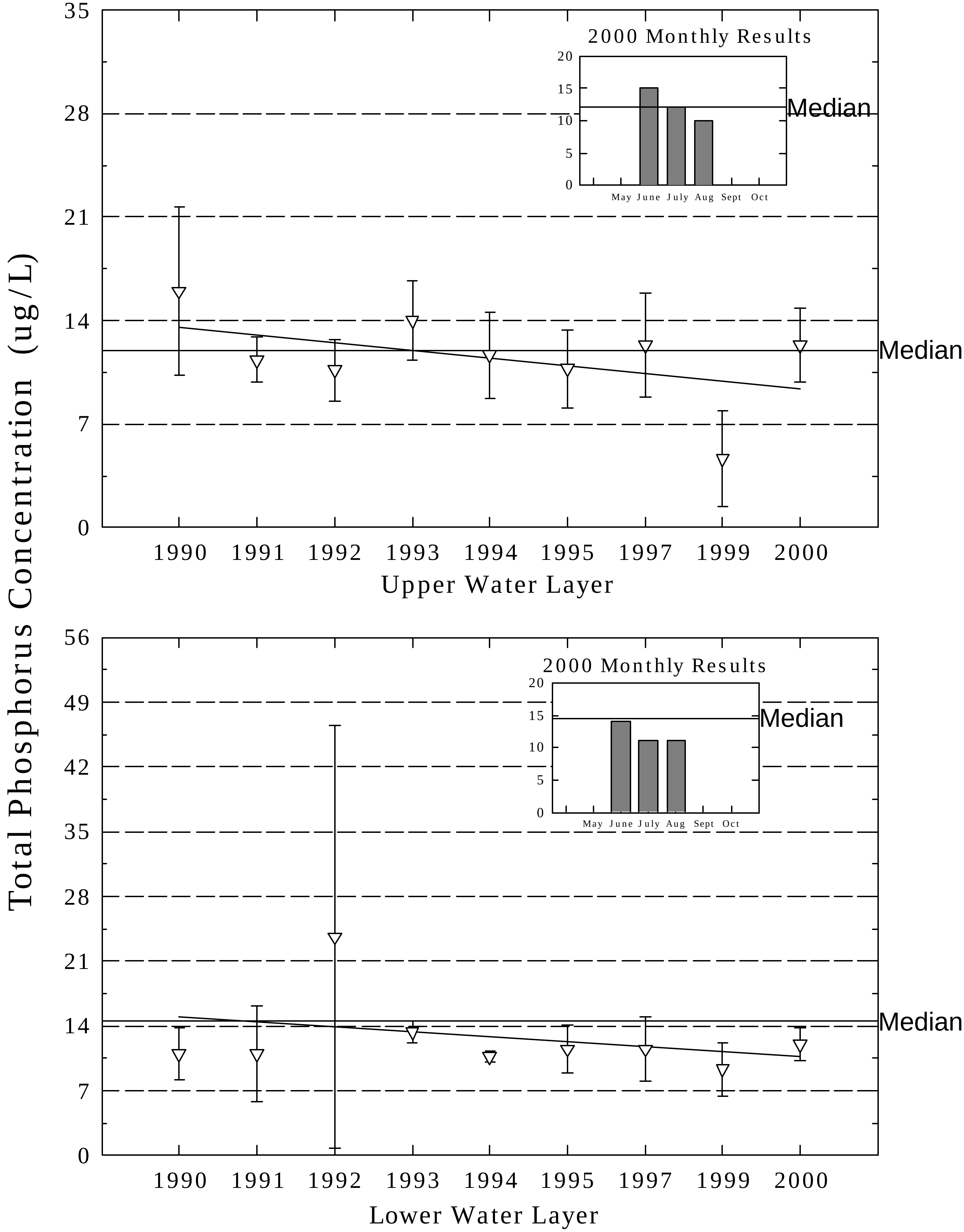


Table 1.

BAXTER LAKE

FARMINGTON

Chlorophyll-a results (mg/m^3) for current year and historical sampling periods.

Year	Minimum	Maximum	Mean
1990	4.54	12.80	7.80
1991	3.80	4.17	3.98
1992	2.72	3.22	2.93
1993	2.73	4.34	3.56
1994	3.81	7.11	5.32
1995	3.44	5.83	4.42
1997	3.44	3.79	3.61
1999	2.94	4.91	3.70
2000	3.82	5.29	4.36

Table 2.

BAXTER LAKE

FARMINGTON

Phytoplankton species and relative percent abundance.

Summary for current and historical sampling seasons.

Date of Sample	Species Observed	Relative % Abundance
06 / 27 / 1990	UROGLENOPSIS	48
	FILAMENTOUS GREEN	31
07 / 23 / 1991	ANABAENA	54
07 / 20 / 1992	ANABAENA	67
	ASTERIONELLA	13
06 / 28 / 1993	MERISMOPEDIA	65
	UROGLENOPSIS	15
06 / 29 / 1994	GLOEOCAPSA	59
	ANABAENA	18
06 / 15 / 1995	MALLOMONAS	23
	ANABAENA	22
	SPHAEROCYSTIS	19
09 / 15 / 1995	MALLOMONAS	25
	MERISMOPEDIA	20
	ANABAENA	15
07 / 09 / 1997	ANABAENA	63
	MALLOMONAS	8
	ELAKATOTHRIX	8
06 / 30 / 2000	ANABAENA	80
	MALLOMONAS	11
	MICROCYSTIS	5

Table 3.

BAXTER LAKE

FARMINGTON

Summary of current and historical Secchi Disk transparency results (in meters).

Year	Minimum	Maximum	Mean
1990	2.0	4.0	2.9
1991	2.7	3.2	2.8
1992	2.2	3.4	2.7
1993	2.6	2.8	2.7
1994	2.6	2.8	2.6
1995	1.9	2.8	2.4
1997	2.5	3.0	2.7
1999	2.4	3.3	2.9
2000	2.1	2.8	2.5

Table 4.

BAXTER LAKE
FARMINGTON

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
CRAVELLI BROOK				
	1997	6.36	6.36	6.36
CRUZE BROOK				
	1990	6.27	6.36	6.31
	1991	5.88	6.70	6.12
	1992	5.64	6.05	5.80
	1995	6.37	6.37	6.37
	1997	6.09	6.09	6.09
	2000	6.17	6.33	6.25
DINNEEN BROOK				
	1990	7.00	7.22	7.10
	1991	6.78	7.10	6.90
	1992	6.26	6.82	6.46
	1993	6.77	6.77	6.77
	1994	6.69	7.10	6.82
	1995	6.80	6.81	6.80
	1997	6.58	6.97	6.78
	1999	6.84	6.88	6.86
	2000	6.65	6.86	6.76
EPILIMNION				
	1990	6.37	6.73	6.51
	1991	6.36	6.60	6.47
	1992	6.47	6.66	6.56
	1993	6.38	6.51	6.45
	1994	6.16	6.44	6.32

Table 4.

BAXTER LAKE
FARMINGTON

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1995	6.31	6.63	6.42
	1997	6.41	6.57	6.48
	1999	6.26	6.42	6.31
	2000	6.39	6.70	6.55
HYPOLIMNION				
	1990	6.57	6.67	6.62
	1991	6.38	6.52	6.46
	1992	6.20	6.57	6.39
	1993	6.38	6.46	6.41
	1994	6.19	6.32	6.27
	1995	6.13	6.46	6.27
	1997	6.30	6.41	6.35
	1999	6.14	6.20	6.17
	2000	6.30	6.45	6.35
OUTLET				
	1990	6.43	6.63	6.52
	1991	6.45	6.64	6.56
	1992	6.27	6.64	6.42
	1993	6.29	6.29	6.29
	1994	6.28	6.28	6.28
	1995	6.47	6.47	6.47
	1997	6.31	6.39	6.35
	1999	6.38	6.44	6.41
	2000	6.45	6.56	6.51

Table 5.

BAXTER LAKE

FARMINGTON

Summary of current and historical Acid Neutralizing Capacity.
Values expressed in mg/L as CaCO .

Epilimnetic Values

Year	Minimum	Maximum	Mean
1990	1.80	3.10	2.45
1991	2.00	2.80	2.50
1992	2.60	3.00	2.83
1993	1.70	2.60	2.10
1994	2.20	2.50	2.40
1995	2.60	3.90	3.05
1997	1.80	3.79	2.76
1999	2.10	2.60	2.33
2000	2.30	2.60	2.47

Table 6.

BAXTER LAKE
FARMINGTON

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
CRAVELLI BROOK				
	1997	40.1	40.1	40.1
CRUZE BROOK				
	1990	43.2	50.8	46.3
	1991	46.5	57.5	52.0
	1992	45.2	48.8	47.0
	1995	45.2	45.2	45.2
	1997	47.6	47.6	47.6
	2000	41.6	43.2	42.5
DINNEEN BROOK				
	1990	71.6	84.7	78.1
	1991	63.1	80.6	72.9
	1992	62.6	70.6	66.6
	1993	70.5	70.5	70.5
	1994	72.3	79.3	76.0
	1995	59.3	80.0	69.6
	1997	65.2	70.6	67.3
	1999	67.7	69.1	68.4
	2000	64.2	71.6	68.0
EPILIMNION				
	1990	32.5	33.6	33.0
	1991	32.5	33.5	33.1
	1992	35.2	36.1	35.6
	1993	35.9	36.9	36.5
	1994	40.1	43.7	41.6

Table 6.

BAXTER LAKE
FARMINGTON

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
	1995	38.8	42.2	40.1
	1997	37.8	39.3	38.3
	1999	49.1	49.6	49.3
	2000	47.5	49.0	48.2
HYPOLIMNION				
	1990	31.7	33.8	32.9
	1991	32.1	34.6	33.2
	1992	31.7	43.4	36.9
	1993	35.1	37.0	36.3
	1994	40.2	41.6	41.0
	1995	39.1	41.3	39.9
	1997	37.7	38.2	37.9
	1999	49.4	50.4	49.8
	2000	47.5	48.9	48.2
OUTLET				
	1990	32.4	33.0	32.6
	1991	32.4	33.2	32.7
	1992	32.1	36.1	34.1
	1993	36.1	36.1	36.1
	1994	40.4	40.4	40.4
	1995	38.9	38.9	38.9
	1997	38.0	38.7	38.3
	1999	48.4	50.2	49.3
	2000	47.7	49.1	48.3

Table 8.

BAXTER LAKE
FARMINGTON

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
CRAVELLI BROOK				
	1997	6	6	6
CRUZE BROOK				
	1990	8	13	10
	1991	7	13	10
	1992	10	12	11
	1995	9	9	9
	1997	14	14	14
	2000	11	16	13
DINNEEN BK CULVERT				
	1991	10	10	10
DINNEEN BROOK				
	1990	10	28	17
	1991	10	32	18
	1992	11	20	17
	1993	9	9	9
	1994	9	12	10
	1995	8	15	11
	1997	9	17	12
	1999	19	28	23
	2000	9	18	13
EPILIMNION				
	1990	12	20	16
	1991	10	13	11
	1992	9	13	10

Table 8.

BAXTER LAKE
FARMINGTON

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
	1993	11	16	14
	1994	10	15	11
	1995	7	13	10
	1997	9	16	12
	1999	1	7	4
	2000	10	15	12
HYPOLIMNION				
	1990	9	13	11
	1991	8	17	11
	1992	9	50	23
	1993	12	14	13
	1994	10	11	10
	1995	9	15	11
	1997	9	14	11
	1999	6	11	9
	2000	11	14	12
OUTLET				
	1990	9	16	12
	1991	6	9	7
	1992	10	15	12
	1993	14	14	14
	1994	10	10	10
	1995	10	10	10
	1997	9	12	10
	1999	7	13	10
	2000	9	12	10

Table 9.

BAXTER LAKE

FARMINGTON

Current year dissolved oxygen and temperature data.

Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
June 30, 2000			
0.1	25.2	4.3	51.8
1.0	25.2	4.3	51.7
2.0	25.2	4.2	51.2
3.0	25.0	4.1	49.0

Table 10.

BAXTER LAKE

FARMINGTON

Historic Hypolimnetic dissolved oxygen and temperature data.

Date	Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
June 27, 1990	2.5	22.5	11.0	127.8
July 23, 1991	2.6	26.8	7.6	95.1
July 20, 1992	2.5	23.9	8.0	95.4
June 28, 1993	2.5	22.7	8.4	95.0
June 29, 1994	3.0	23.0	7.5	87.0
June 15, 1995	2.5	19.4	7.9	84.0
September 15, 1995	3.0	18.0	8.2	86.0
July 9, 1997	3.0	24.6	8.7	102.0
June 22, 1999	3.0	22.7	5.5	63.7
June 30, 2000	3.0	25.0	4.1	49.0

Table 11.

BAXTER LAKE
FARMINGTON

Summary of current year and historic turbidity sampling.
Results in NTU's.

Station	Year	Minimum	Maximum	Mean
CRAVELLI BROOK				
	1997	0.3	0.3	0.3
CRUZE BROOK				
	1997	0.1	0.1	0.1
	2000	0.2	0.2	0.2
DINNEEN BROOK				
	1997	0.1	0.8	0.3
	1999	0.4	0.7	0.6
	2000	0.1	0.4	0.2
EPILIMNION				
	1997	0.4	0.6	0.5
	1999	0.4	0.7	0.6
	2000	0.4	0.6	0.5
HYPOLIMNION				
	1997	0.4	0.6	0.5
	1999	0.4	1.0	0.7
	2000	0.2	0.7	0.5
OUTLET				
	1997	0.4	0.4	0.4
	1999	0.4	0.6	0.5
	2000	0.3	0.6	0.4

Table 12.

BAXTER LAKE

FARMINGTON

Summary of current year bacteria sampling.
Results in counts per 100ml.

Location	Date	E. Coli See Note Below
DRAINAGE		
	June 30	1

NOTE: "<" means "less than" and ">" means "greater than"